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A SERIES OF INTERVIEWS WITH MEMBERS OF GERMAN MEDICAL SCHOOLS, RESEARCH INSTITUTES AND HOSPITALS

5 June - 10 July 1945.

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COMBINED INTELLIGENCE OBJECTIVES
SUB - COMMITTEE

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15

A Series of Interviews with Members
of German Medical Schools, Research Institutes
and Hospitals.

5 June - 10 July 1945.

Reported by.

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CIOS ITEM 24
MEDICAL

COMBINED INTELLIGENCE OBJECTIVES SUB-COMMITTEE
G-2 Division, SHAEF (Rear) APO 413.

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R E S T R I C T E D

I. Introduction. This report is a consolidation of information obtained as the result of the interrogation of faculty members of several German medical schools and of the members of the staffs of various research institutes and hospitals. The interrogations were conducted separately by the several investigators listed on the title page. The heading of each section of the report indicates the investigator responsible for its preparation.

It must be noted that this report does not represent the results of exhaustive investigation of the targets discussed, but is rather in the nature of an evaluation. It was felt that grouping of the numerous original brief reports would result in greater general utility especially since the information obtained from certain of the targets was inadequate to justify publication of a separate report.

II. Medizinische Fakultät, Tübingen (Captain Schwarz).

A. General: The report on this medical school consists of a series of interviews with members of the faculty.

B. Prof. Dr. Hans - Hermann Bennhold, Director of the Medical Clinic. Prof. Dr. Bennhold has been the director of the medical clinic since 1942. The hospitals connected with it are in excellent condition and well equipped. Connected with the medical clinic was the "Marineärztliche Akademie" (Navy Medical Academy) which was under Flottenarzt (Navy Doctor) Greul. The former Marinestabsarzt (Navy Doctor) W. Borgard, who worked at the Navy Academy, is now assistant of Prof. Bennhold. The Naval Medical Academy ceased functioning about six (6) months ago.

Prof. Bennhold is interested in the serum proteins and their reactions, the protein bodies of the blood plasma, about which he wrote a book which became the outstanding publication in this field in Germany. It was published in 1938. Co-authors were Prof. Dr. E. Kylin, Director of the Medical Clinic in Jönköping (Sweden) and Prof. Dr. St. Rusznyak, Director of the University Medical Clinic Szeged (Hungary). The book deals in detail first with the more common physico-chemical facts of the blood and the blood proteins. Then it gives a detailed description of the physiological data of the plasma protein bodies. Another chapter deals with the origin of the plasma proteins and methods to determine them qualitatively and quantitatively. The osmotic and colloidal qualities are discussed in detail.

Bennhold is most interested in the vehicle function ("vehikel funktion" as he calls it) of the plasma proteins. Just as the erythrocytes carry oxygen or carbonic acid, the blood proteins carry specific substances or act as "carriers". For instance, bilirubin

is carried by the albumins, cholesterol by the globulins. Acid dye stuffs are always carried by the albumins. Altogether about 100 different substances and the vehicle relation to them of the plasma proteins were examined. He established that prontosil and atebrin are carried by the albumins, karotin and several other vitamins by the globulins. Others like calcium are "free" and not carried by the proteins.

The question of how these different substances are bound to the protein can not be answered at present. It is assumed that physical (adsorption) and chemical processes take place.

Bennhold then examines the question of whether the organism can adjust this vehicle apparatus to the necessities that arise in certain pathological conditions. He finds an albuminseria in cases of lowered cholesterol.

Certain studies with acid dye stuffs (congo-red) led Bennhold to the discovery of the congo-red test in amyloidosis. Originally he tried to examine the disappearance of congo red from the circulating blood in several different diseases. In a case of amyloid nephrosis he found that the whole dye stuff had disappeared from the blood after sixty (60) minutes (instead of only thirt (30%) per cent as in normal patients). When an autopsy of this patient was performed, it was found that the amyloid substance in the different organs had been dyed red. The congo red is absorbed by the amyloid in vivo and in vitro. The congo red method for the dying of amyloid has been generally accepted today and also serves as a diagnostic test for amyloidosis in vivo.

Internal secretion is another field of special interest of Prof. Bennhold. He is mainly interested in the physiology and pathology of the pituitary gland. He has published one monograph on Cushing's syndrome. Several cases with the typical organic and emotional changes are described. Bennhold discusses all therapeutic possibilities, x-ray of the pituitary gland, resection of the suprarenal glands or including removal of the anterior lobe of the pituitary gland. He comes to the conclusion that all these measures are of very doubtful or no value. He thinks that following hormon (Progynon B) five (5) mg twice weekly, combined with small doses of thyroidin, promise the best results.

The first mass experiments with Periston were carried out by him. Periston was synthesized by bio-chemist Weese of the I.G. Farbenindustrie. Bennhold found that it has physical and colloid chemical properties very similar to blood serum and that its "vehicle properties" are almost identical. More than 40,000 cases have come to his attention without any untoward effect. It always increases the sedimentation rate, a phenomenon which is not sufficiently explained as yet.

C. Prof. Dr. Willy Usadel. Director of the Surgical Clinic.

Prof. Usadel has been the Director of the Surgical Clinic in Tübingen for the last eight (8) years. He is a disciple of the famous German surgeon, Kirschner, and became his successor when the latter died. He has been consultant surgeon of an army and was released one year ago. He then became consultant surgeon of the Wehrkreis V, Stuttgart. His own surgical clinic has been taken over by the French and he now does his work at the Gynecological Clinic.

He is a specialist in abdominal surgery. He is at present working on a test of cardiac function and circulation (kreislauffunktions test) for the surgeon. He thinks that surgical shock is caused by a direct nervous impulse, arising from the surgical injury or trauma and reaching the brain like any other nervous impulse. This creates at first a "tonic reaction" which can change into the atomic phase at any given moment. He believes in this nervous theory for the following reasons: Whenever he did abdominal surgery under spinal anesthesia and after anesthetizing the vagus and sympathicus nerves (bloc) no shock or shock-like reactions occurred because the "traumatic impulses" could not reach the brain.

His research on the blood supply of the stomach and its use in intestinal plastics is the basic work in this field. It brought him to the attention of the Rockefeller Foundation, which granted him generous financial support.

In technical respect Prof. Usadel, is very much interested in operations for cleft palate. He modified the classical "Axhausen" method.

The most important war surgical problem was infection. He thinks that rest is the most important procedure after any injury and the wounded should not be transported until infection is checked.

About German foreign body locators, he was very unenthusiastic. None of them is any good. He still relies on stereoscopic x-rays.

In amputees the Sauerbruch prothesis is still the method of choice. He knows Dr. Henschke in Garmisch and thinks highly of his work.

He has worked with Prof. Keuntscher in Kiel on his method of nailing fractures (Marknagelung-bone-marrow nailing). He has given this method up completely for two (2) reasons:

1. It can only be used in fractures where no fragmentation has occurred.
2. The method is dangerous from the standpoint of bone marrow infection. Retzius u. v. Redwitz have proven, that the bone marrow

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Prof. Albrecht has been the head of the clinic for eleven (11) years. He is primarily interested in the problem of deafness, the hereditary factors involved and the pathological changes that take place. On these problems he worked together with Prof. Davenport in America. He published several articles on disease of the ear which are either caused or influenced by hereditary factors. The close pathological study of all cases permitted him to draw certain conclusions regarding hereditary and acquired deafness.

He is strictly against indiscriminate tonsillectomies. He thinks that the tonsils have a purpose but has no clear conception what it consists of. The general observation that the body has a tendency to form new lymphatic tissue on the walls of the pharynx after the tonsils needs this protective lymphatic barrier. The size of the tonsils is no criterion of their condition. A large tonsil can be perfectly normal, a small one severely diseased. The only indication for tonsillectomy is a status of chronic purulent inflammation. If the tonsil contains evil-smelling pus, it must be removed. Sulfonamides have become the best therapeutic weapon of the ear, nose and throat specialist. They should not be given indiscriminately. In cases of tonsillitis, they act only if given early. Once the fever has reached its peak, they are worthless. In otitis media they should be used under close clinical supervision. Local applications of sulfonamides in pathological conditions of the oral cavity or the throat are of no value. Sulfonamides are considered as excellent in meningitis. He has tried them out in several cases of thrombosis of the cavernous sinus (Cibazol). It should always be used in combination with surgery. Results are doubtful and not enough cases have been observed.

Prof. Albrecht has done research on the genesis of genuine cholesteatoma. He believes, that the presence of embryonic tissue in the recessus is the cause or the "conditio sine qua non" for the development of genuine cholesteatoma.

F. Prof. Dr. August Mayer, Director of the Gynecological Clinic.

The clinic in which Prof. Mayer works is completely intact and at present he has about 200 female patients, either surgical or obstetrical cases. Prof. Mayer is seventy (70) years old and has been the director of the Gynecological Clinic in Tübingen since 1918. From several of his statements it appears that he is anti-Nazi and eager to talk.

He is especially interested in what he calls "Psychogynecology", (The psychological therapy of women in contrast to the organ-therapy). He knows Alfred Adler, but does not know anything about Freud or Helen Deutsch. His method is not psychoanalytical and does not follow a certain, specific scheme. It is based primarily on common sense, confidence of the patient in the advising physician, discussion of the individual problem. Prof. Mayer thinks, that many of the more.

common gynecological ailments such as dysmenorrhea, metro and metrorrhagia, pruritis vulvae and many forms of leukorrhea have a psychic origin.

Gynecology and constitution has been another field of interest. He thinks that the proper study of a woman's constitution is of great importance in evaluating her physical status or the existing ailment. It is important for surgical and obstetrical indications and prognoses. He thinks that we have too much confidence in the "scheme", without having the proper regard for the individual woman, her psychological and physical make up.

Hormone research was carried out by Prof. Mayer as early as thirty(30) years ago. This was based on the following observations: When he injected blood of pregnant women into other pregnant women suffering from herpes gestationis, the herpes disappeared within a few days. This led him to the conclusion that the blood of pregnant women ordinarily contains a substance the absence of which will cause herpes. He treated about fifty (50) cases of this type of herpes and cured most of them with injections of pregnant womens' blood. Animals (frogs and young guinea pigs) showed characteristic changes on their ovaries after blood from pregnant women had been injected. Today we know that this is based on a hormone effect and that small doses of progesterone cure herpes gestationis.

Cancer problem - Prof. Mayer states that cancer is on the increase in Germany. He has observed (and this has been confirmed by other medical schools) that young women between the ages of twenty (20) to thirty (30) years are affected more often than ever before. Here he operates immediately and very radically. In older women he is more conservative and prefers x-ray and radium, at least as a presurgical procedure. A great number of women die from peritonitis/operations for cancer. The peritonitis often resulted from infected and putrefied cancer. The mortality after abdominal operations was as high as sixteen (16%) per cent. After previous x-ray treatment the mortality rate dropped to about four (4%) per cent, because the preliminary x-ray treatment checks the infection and creates better conditions for surgery. The surgical technique has not materially improved within the last few years. The "classical Wertheim" method is still applied and as much as possible of the surrounding lymph-tissue is removed.

Sterility is treated in the same way as in the U.S. If there are no gross pathological findings and after the woman's husband has been examined, the woman gets a Rubin test. If this is negative, follicular hormones can be tried but Prof. Mayer doubts their value. Artificial insemination should be tried two (2) weeks after the last menstruation but failures are numerous. Prof. Mayer thinks that in many cases sterility has a psychological cause. A deep seated unconscious aversion to the husband can create spastic conditions in the genital tract which prevent conception or lead to abortion. Here only psychological treatment will help.

G. Prof. Dr. Erich Letterer, Director of the Pathological Institute.

The institute is completely intact and has suffered no bomb damage. Prof. Letterer is forty-six (46) years old and a disciple of the famous German pathologist, M.B. Schmidt in Würzburg. He has been the director of the institute since 1938.

His main field of interest centers around amyloidosis, its origin, contributing factors and prevention. The results of this research have been laid down in one publication, "Studien über Art und Entstehung des Amyloid.. Letterer succeeded in creating amyloidosis in white mice by injecting nuclein subcutaneously. A sterile abscess formed at the site of the injection, in turn produced amyloidosis within from three (3) to six (6) weeks. Letterer thinks that amyloidosis occurs whenever the mechanism of antibody formation of the organism is paralysed. This leads to a precipitation of protein bodies within the cell with resulting amyloidosis. He found that this antibody formation depends to a large extent on the type of food that the test animals get:

1. When he feeds his mice with proteins only, they developed amyloidosis very quickly.
2. When he fed them fats only it took two (2) to three (3) months, the longest time he ever observed.
3. Carbohydrates alone are better than proteins, but not as good as fats.

He concludes that fat prevents amyloidosis because it supports the antibody formation, whereas protein accelerates amyloid formation. Kuczynski succeeded before him in producing amyloidosis by feeding mice pot cheese excessively. Letterer produced amyloid in white mice by injecting sodium casein and later produced it in 100% of his animals by injecting casin. It was always the spleen that was affected first, then the liver and then the kidneys. The cholesterol level in the blood stream does not seem to affect the amyloid formation.

The most important points and results of the amyloid research are:

1. Daily injections of sodium-casein or five (5) per cent solutions of casein produces amyloidosis in mice.
2. The congo-red dying method of amyloid (Bennhold) is based on the alkali addition to the dye, not the protein addition as originally described by Bennhold.
3. The amyloid substance contains between two (2) and five (50 per cent cholesterol, which originates from the blood serum.

4. Concentration and dosage of the casein solution have no influence on the production of amyloidosis. The casein is not specific. Every protein body if given parenterally can lead to amyloidosis.

5. The sterile implantation of tissue pieces of the same species can lead to amyloidosis.

6. Colloidal sulfur and selenium if given parenterally can cause amyloidosis whereas iron in the same form has no such effect.

7. The combination of these injections with reduction of the water intake of the test animals increases the number of amyloid cases.

8. Intercurrent infections have no distinct influence on the number of positive cases.

9. There are important reasons of a chemical and experimental nature to consider globulin as the mother substance of the amyloid.

10. Hyperglobulimosis is the cause of amyloidosis.

Letterer carried out extensive research on the pathological anatomy of the lipoidosis. The results of this work have been laid down in his publication, "Allgemeine Pathologie und Pathologische Anatomie der Lipoidosen". (General pathology and pathological anatomy of the lipoidoses). This publication appeared in 1939. It was especially Niemann-Pick disease (Hepatosplenomegaly) which attracted his interest. He comes to the conclusion that it is a growth disturbance. The disease itself is characterized by the formation of large lipid containing cells, the latter having been analysed as sphingomyelin. Gauchers disease has been studied and was considered a disease of the reticulo-condothelial system.

Further information received by Prof. Letterer : The outstanding tumor research man in Germany today is Prof. Leupold, formerly of the Cologne Medical School. Leupold has succeeded in creating cancer in all his test animals by disturbing the ion equilibrium of the cells in certain organ sectors. His work has not been published yet, but seems to open completely new roads in tumor research. It approaches the problem from a new angle, which is partly physiological-chemical, partly physical. Prof. Leupold (according to Letterer) was in Cologne until 1943. When his institute was destroyed he went to a small town near Plauen where his father-in-law had a farm; Letterer assumes that he might have returned to Cologne as Plauen is in Russian territory.

H. Prof. Dr. Franz Knoop, Director of the Institute for Physiological Chemistry.

The Institute is completely intact and has suffered no bomb damage. Prof. Knoop is seventy (70) years old, speaks English fairly well and has visited the United States three (3) times. In 1913 he was asked to open and equip the Physiological Chemistry Department of the Rockefeller Institute, where he worked with Welsh and Smith. In 1929 he visited the International Congress of Physiologists in Boston. In 1930 he held the Dunham lectures in Boston. He has been a member of the Tübingen faculty since 1928 and a co-writer of the "Bio-chemical Lexikon".

He has become best known through his research on intermediary metabolism which led him to the discovery of the B-oxydation of fatty acids. The results of this research have been laid down in his monograph, "Der Abbau aromatischer Fettäuren im Tierkörper" (The metabolism of the aromatic fatty acids in the animal organism).

Knoop considers his analysis and synthesis of certain amino-acids as the greater and more important discovery but it brought him less fame than the B-oxydation research. His monograph, "Unter die Stickstoffbindung bei der Eiweisa-synthese in der Natur und das Interesse der Biologie an den physiologischen Oxydationsreaktionen und ihrer Umkehrbarkeit" (about N-absorption in the protein synthesis) is the result of this research; it describes in detail protein syntheses from non-protein substances. "The reversibility of physiological reactions" is a further explanation of physiological chemical reaction in the metabolism of animals.

Research carried out at present deals with the citric acid cyclus, but has not led to any definite results.

I. Prof. Dr. Otto Stickl, Director of the Hygiene Institute.

Prof. Stickl is at present Rector of Tübingen University and Director of the Hygiene Institute. He was appointed Rector by the French authorities because of his political reliability. The institute is undamaged, the electron microscope that was installed here has been removed and an ultra-centrifuge was in the process of being removed. The institute houses most of the research laboratories of the Kaiser Wilhelm Institute for Bio-chemistry, which was evacuated from Berlin to Tübingen. The director Prof. Butenandt has his office here.

Combined with the Hygiene Institute is the socalled "Medizin-Untersuchungsmat" (Medical research and test laboratories). This place performs hygienic, bacteriological and pathological examinations and is considered the highest authority in this field within the state.

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(In this case, Württemberg). It corresponds to the laboratory in each Wehrkreis, only that it serves civilian needs only.

Lately the effect of the different sulfonamides on bacteria and their structure was studied. Sulfonamides have primarily an impeding effect on bacterial growth, endo- or exotoxins are not affected by it. It is therefore of primary importance to give the sulfonamides as early as possible in infectious diseases, before the bacteria increased too much in number.

The effect of sulfonamides on intestinal bacteria and their antagonists was studied. Two (2) preparations, "Globucid" and "Pyrimal" (Sulfapyridine), were being used. It was found, that both preparations had a good effect against dysentery and typhus abdominalis (typhoid). In both diseases twelve (12) gram was given in twenty-four (24) hours.

Research was carried out with hepatitis epidemica which Prof. Stickl states was the most important military medical problem. They tried to transmit hepatitis to birds, especially canaries and mice, by directly injecting bile extracts and dilutions into these animals. Here they did not succeed in creating true hepatitis or even liver pathology. Prof. Stickl believes that he succeeded in creating true hepatitis in white mice through the inhalation method. Bile from hepatitis patients was taken by duodenal tube. Different dilutions in sodium chloride solution were prepared and these sprayed with an atomizer into the cage of the mice. The mice became sick after two (2) to three (3) weeks. They died or were killed after five (5) to six (6) weeks. The liver showed similar changes to those in true human hepatitis. Certain kinds of virus were cultivated, but they have not succeeded in cultivating or isolating one specific hepatitis virus. Stickl does not know anything about the existence of pure cultures. Research in this field has not continued since the electron microscope was removed.

Other research problems dealt with the effect of all common and new disinfectants on the structure of bacteria. This work has not been finished and has not been published yet, again for the lack of the electron-microscope.

J. Prof. Dr. Felix Haffner, Director of the Pharmacological Institute.

Prof. Haffner has been the director of the Institute for Pharmacology for the last twenty (20) years. He is sixty-one (61) years old, speaks no English. He impressed this investigator as being a sick man, reluctant to speak, not because he does not want to speak, but because it is a physical effort for him. His institute, which is physically intact, has partly been taken over by French Military Authorities, who operate an army laboratory in it.

Prof. Haffner did research on the metabolism of the cell and substances that damage the cell or disturb its metabolism. No practical results were obtained.

In 1942 the "Reichsanstalt für Wasser und Luftgüte" asked him to do some research on the purification of water and large water sources (lakes and rivers) which had been contaminated with arsenic containing war gases. The German "Reichsanstalt für Wasser und Luftgüte" (ReichsInstitute for Water and Air Purity) was a department within the Ministry of the Interior, responsible for the supervision of German water sources (mostly lakes and rivers) and air, so that no contamination took place from mines, industries, etc. The Germans had found tremendous stores of mustard and lewisite in Russia and feared that the Russians would eventually resort to gas warfare and rely on contamination of German water supply sources. Seventy (70%) per cent of all drinking water in the eastern part of Germany comes from lakes. The Germans wanted to be prepared against this eventuality. It was to be examined whether the usual amounts of chlorine, which were being used for the disinfection of water also had a detoxifying effect on the chemical warfare agents. Haffner found that ten times as much chlorine was necessary to detoxify water that had absorbed the maximal dose of mustard. Water will only absorb a certain amount of mustard or lewisite. Once this maximal concentration ten times as much chlorine would be needed as is ordinarily needed for purification of the water, this makes it impossible and it must be dechlorinated again. All reports on Prof. Haffner's research in this field have been turned over to a CWS Team which visited him several days before this investigator.

Means for the conservation of foodstuffs and medicines were tested. This represented another war problem. Nothing new was found. The best conservation substance for solid food is still formaldehyde (parafom), for semi-solid and liquids, potassium or sodium bisulfite.

The mechanism of the sulfonamide effect was investigated. Former findings, that the sulfonamides impede mitoses and therefore the increase of bacteria but do not kill those that are present already, were confirmed.

Tests were carried out with frog eggs, of which it was known, that they prevented milk from getting sour. (The old folk knowledge to put frog eggs into milk was taken up again.) Haffner proved that frog eggs can actually destroy lactic acid bacteria. The skin of frogs has even a stronger effect on lactic acid bacteria. He has not tried other organisms yet but thinks that the skin of frogs produces a substance which has a strong anti-bacterial effect. He has not succeeded in crystallizing the substance and has no idea as to his chemical structure. Research in this field is continued at present.

K. Professor Dr. Adolf Butenandt, President of the Biochemical Institute, Kaiser Wilhelm Gesellschaft, Berlin-Dahlem, now at the Hygiene Institute, Tübingen. (Captain Schwarz).

The Bio-Chemical Institute of the Kaiser Wilhelm Gesellschaft of which Prof. Butenandt was the director was evacuated from Berlin in the summer of 1943 in part and the rest in early 1945. Prof. Butenandt was its director since 1937 when he was only thirty-four (34) years old. He is honorary professor of the Berlin Medical School but has actually studied chemistry.

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Prof. Butenandt has been interrogated several times before by American scientists besides others by Prof. Fieser of the Harvard Medical School and by the bio-chemist Bowmann who has visited all institutes in Tübingen and received copies of Butenandt's publication.

Prof. Butenandt is forty-two (42) years old now and speaks English fairly well. He was in the United States for three (3) months in 1935 on invitation from the Rockefeller Foundation. He was the first one to crystallize the male and both female sex hormones (corpus luteum and follicle hormone). He then analyzed their chemical structure and succeeded in synthesizing all three (3) hormones out of cholesterol (sterines). For this work he won the Nobel prize in 1939. When he had succeeded in crystallizing and analyzing these substances it turned out that they had a very close chemical relationship to cholesterol (sterine) from which they were subsequently synthesized. His co-workers were Ulrich Westphal, and Kurt Tauberling. Of these, Westphal is the best known (he is also a Nobel prize winner) and is at present at St. Johann. He was a member of the German Military Medical Academy.

Cancer Research - Prof. Butenandt has done extensive research on the question and relationship of cancerogenous substances and sex hormones. The original idea was that sex hormones might be changed or transformed into cancerogenous substances, and all sex hormones and related chemical compounds were submitted to extensive tests on whether they could produce cancer. None of these substances were found. The theory that the follicular sex hormone can cause cancer holds only true in those mice generations that were "stigmatized" before, meaning that breast cancer already existed in their own previous generations in these mice. Tremendous dosages of follicle hormone (about 2,000,000 units) were necessary to create cancer in these mice. The normal mouse that had not been "stigmatized" would never get cancer, no matter how much follicular hormone is injected.

Prof. Butenandt is at present working with different hydrocarbons which in their clinical structure are similar to sex hormones and he is trying to find whether they have a cancerogenous effect. No definite results have been obtained yet. All these experiments are carried out with mice.

Research on Physiology of the Chromosome of Insects. - It has been found that each chromosome or gene, the normal carrier of hereditary factors, produces a certain effective substance (Gen Wirkstoff), which in turn creates the specific hereditary effect which was ordin-

arly attributed to the chromosome or gene. Experiments were carried out with two (2) species of flower moth (the black eyed and red eyed species).

In the black eyed moth the chromosome produces the effective substance. (Prof. Butenandt called this stuff "Gen Wirkstoff A"). It has been found that this is a derivative (oxydation product) of tryptophan called keynurenin. If this is now injected into the red eyed species, they too get black eyes. Since keynurenin is obviously identical with the Gene Wirkstoff A (gained from body extracts of the black eyed moth) both substances will produce the same effect in the red eyed species. Prof. Butenandt thinks that the change from tryptophan into keynurenin is caused by a ferment which in turn is produced by the chromosome or gene and is specific for it.

Similar experiments have been carried out with the drosophila fly. The drosophila fly has a characteristic, multifaceted eye. The number of facets is characteristic for the different species of drosophila. If certain body extracts of the species with the greater number of facets are injected into a species with a smaller number of facets, the eye in the latter will change and the multifaceted species will be the final result.

All these tests have lead Prof. Butenandt to the conviction that the gene produces a certain substance which is specific for it and which in turn produces a specific hereditary effect. This research has been carried out together with Prof. Kühn, Director of the Kaiser Wilhelm Institute for Biology, which is at present located in Hachingen, the latter doing the biological and Butenandt the biochemical part of the research.

In no case have they succeeded in crystallizing this specific substance. They know that it is basic, water soluble and that it influences mitosis.

Virus Research. - Virus research was carried out under Prof. Butenandt's supervision with the tobacco mosaic virus and mutation variants. They worked especially on the chemical constitution of virus and have found that it is a protein (nucleo protein) which, as they think, is an integral part of all viruses. The recent removal of the electron-microscope has made it impossible for Prof. Butenandt to continue this type of research.

At present Prof. Butenandt is interested in an entomologic problem, about which no publications have appeared. The problem involved is about as follows: It has been known that most insects, especially butterflies and moths, can attract the opposite sex over great distances and it has been the subject of the theoretical

scientific discussions, how this is accomplished. At times electric waves, sound waves or certain glandular products affecting the olfactory sense have been held responsible for this phenomenon.

Prof. Butenandt has worked with silk moths, removing thousands of abdominal glands from these insects and then making benzine extracts from these glands and even in dilutions from 1 to 1,000,000 this substance is extremely effective and attracts all males which are ordinarily lazy and do not move. When he dipped a glass rod into this solution he could actually draw all the males after him. The stuff is so strong that after working with the material, even the clothing attracted all males. They have not succeeded in crystallizing or analyzing it, it will be easy to synthesize it for every specific species. He thinks that they are all chemically related to each other. Prof. Butenandt thinks that this invention would revolutionize the whole problem of the fight against insects, since they could easily catch all the males and eliminate the species within a short time.

The following additional information was received from Prof. Butenandt:

That the Kaiser Wilhelm Institute for Physics is at present at Hechingen and its director is Prof. Dr. Heisenberg.

That the Kaiser Wilhelm Institute for Chemistry is at Tübingen and its director is Prof. Dr. Hahn. According to Prof. Butenandt, both directors were removed from their institutes by a group of American scientists and he assumes that they are both in America.

1. Prof. Dr. W. Engelhardt, Director of the Skin Clinic.

The skin clinic is in good physical condition and well equipped. It has altogether 150 beds, of which seventy are occupied at present. According to German custom, the skin department also houses the clinic for venereal diseases and the skin specialist was at the same time the specialist for venereal diseases. Prof. Engelhardt has been the director of the clinic since 1937. He is not a party member and eager to talk. He is a disciple of Jadassohn, one of the more outstanding dermatologists of the past era. Engelhardt's special field of interest are the mycoses, but he states, that nothing actually new has been found in regard to these skin affections.

Two new remedies against scabies have been tested by Prof. Engelhardt. They are not being mass-produced yet, but have passed the research stage.

1. Kräutzemittel Sch 514 is manufactured by "Bayer" I.G.

Farbenindustrie in Leverkusen. It was sent to Engelhardt from the I.G. and he was asked to test it for its therapeutic qualities. It is a water colored heavy liquid with an oily consistency and a slightly aromatic smell. The formula is kept secret and Prof. Engelhardt states that he does not know what it contains, also that he does not know the name of the chemist, who made it. If brought on the skin, it leaves an oily film and has a tendency to wrinkle the skin slightly. A 200 cc sample of this new substance was obtained and will be sent forward under separate cover. (See reports on I.G. Farbenindustrie Elberfeld and Leverkusen).

2. The second new scabies remedy is Scabisitin, manufactured by "Chemische Fabrik" Klinke in Hamburg. Formula and chemist who made it are unknown. The substance is white, has a semi-solid gelatinous consistency and a slight aromatic and sulfur odor. It seems to have a tendency to form a fungus on its surface. A 250 cc. bottle of the substance was obtained from Prof. Engelhardt and will be forwarded with the first sample.

Comments of Prof. Engelhardt on these two preparations:

1. Sch 514 was used in 140 cases of scabies with excellent results. The original claim by I.G. that one application should be sufficient for a cure must be modified; three to four applications are necessary to eliminate the scabies. In adults no untoward symptoms were observed; in babies or young children, it irritates in twenty (20%) of the cases, causing erythema, which sometimes needed treatment. Prof. Engelhardt thinks that 514 is an organic sulfur preparation.

2. Scabisitin was tried in seventy (70) cases, is not as good as 514, but never irritates. Six to eight applications were necessary to check scabies. Its heavy consistency is a disadvantage from a practical viewpoint. It does not stain the cloth, however, it can easily be removed with water and soap.

Further problems discussed with Prof. Engelhardt:

1. Venereal diseases have increased 400% in the Tübingen area within the last three months and are still on the increase. Gonorrhea is the major problem. It is treated with sulfathiazole, if it is available, but local treatment always is given in addition. Here the usual silver protein solutions, like targesin, albargin or protargol are being used. Syphilis is the lesser evil, but Prof. Engelhardt told this investigator that he sees an average of three to four cases of fresh, primary syphilis daily whereas in former years he sometimes had to wait a month before he saw a case. Lues is treated with neo-salvarsan as follows: Seronegative cases receive twelve injections of 0.3 to 0.45 gm neo-salvarsan within six weeks, so that the patient receives five to six gm within that period. Two injections are given weekly. At the same time he receives one

injection of 1 cc of bismegonal intramuscularly with each neo-salvarsan injection. After five to six weeks, he receives a second course of treatment with the same dosage. In seronegative cases three such courses are being given. After that time a spinal tap is done and if the spinal fluid is negative, the patient is considered cured. In sero-positive cases five to six such courses of treatment are necessary over a period of from eighteen to twenty-four months. Late syphilis cases receive fever therapy, sometimes combined with salvarsan-bismuth therapy.

2. Prof. Engelhardt did not know anything about the existence of new remedies against heat-rash.

3. Several new remedies exist against erythema solaris.

a. Dibenzalazin or "Lichtschutz substanz #6653" manufactured by Merck and Co., in Darmstadt. The substance consists of small, slightly yellowish crystals without any specific odor. It is soluble up to five (5%) per cent in the usual vegetable oils that are used for cosmetic purposes. The exact chemical formula is a secret. It is most likely a derivative of gumarin, belonging into the class of the umbelliferons. (See report on E. Merck).

b. The second preparation is "Heliolan", manufactured by Schimmel and Co. (Location not known). Chemical formula unknown. Strong but pleasant smell, oily solution containing aetheric oils. Distillation tests make it probable that it contains geranium oil. No samples were obtained of these two preparations and Prof. Engelhardt could give no information as to their qualities. Following is a translation of a report on them: "Excerpt copy from Heeres - Sanit a-Inspektion 87 r S Ph IIa Nr. 116/44 of 25 May 1945.

Re: Instructions for the pharmaceutical service No. 31. (Collective instructions).

Dibenzalazin (Manufacturer: Merck) and
Heliolan (Manufacturer: Schimmel & Co.).

Reddening of the skin and tanning are caused by ultraviolet lights especially by the ultraviolet radiations of the wavelengths around 295 mm, 380 mm, and to a slighter extent by rays with wavelengths around 380 and 408 mm. Skin burns are caused by an overdosage of ultraviolet rays with wavelengths around 295 mm (depending on the sensitivity of the skin in question). Thus the skin must be protected primarily against the excessive effect of the ultraviolet rays situated around 295 mm. One must attempt to insert a filter into the course of the radiations, which weakens or completely stops the noxious ultraviolet radiations with a wavelength around 295 mm, whereas it permits the other light rays to pass. One may, for

example, produce such filters by covering the skin with a layer-forming fluid, e.g. oil or cream, in which a substance is evenly distributed which reflects or absorbs the ultraviolet rays in the noxious range. The application of oil or cream alone may protect only to a very slight extent against excessive ultraviolet radiations. Attempts were made to obtain effective protection by introducing large quantities of pigments, such as zinc oxide or titanium white. These pigments, to be sure protect the skin, as they allow almost no light to pass, but the use of these ointments is not pleasant. A certain progress was made by the use of such substances as filters, which in dissolved form absorb ultraviolet light, but which permit other light to pass. For this purpose, quinine salts were formerly used extensively, esp. quinine-bisulfate. However, the quantities of quinine salts for an effective protection against the ultraviolet rays must by necessity be very large. Undesirable properties of the quinine compounds may become apparent in the application of such preparations. Also other preparations, recommended frequently in literature, such as phenylsalicylate, must be applied in very high concentrations.

Much better in their absorptive effect are the gumarin derivatives which were later recommended as ultraviolet filters: the first of these, *angulin*, prepared from the bark of the horse-chestnut tree, was used widely. Also the water-soluble preparations (by Merck) *B. umbelliferon acetic acid* and the light-protection substance "3575", belong to this group of light-protection substances. Even in slight concentration these preparations possess excellent absorption of the noxious ultra-violet rays.

Oil, however, is much more successful in forming a uniform and sufficiently durable film upon the skin, than the aqueous substances. For this reason the two abovementioned substances are still no ideal light-protection substances. A good solution was obtained by the discovery of the oil-soluble "light protection substance" 6653^a. This substance presents "Dibenzalasin", required for the light-protection emulsion. The substance consists of small, pale yellow, practically odorless crystals, which dissolve readily with stirring and slight heating in vegetable oils for cosmetic use in quantities of up to about 5%. Stable solutions may also be prepared in mineral oils and many oil-like solvents.

The exact chemical composition of the preparation "Dibenzalasin" is not known and is kept secret by the industry; it is probably a gumarin derivative of the umbelliferon class.

The preparation "Heliopan" of the firm, Schimmel & Co., unites likewise in oily solution good ultraviolet-light absorption and greatest possible skin protection. The firm does not furnish any closer details concerning the chemical composition; these are kept secret. There are, however, ethereal oils with strong characteristic odor. Distillation experiments allow one to assume,

among other things, the presence of geranium oil.

Dr. H. Hällstrung is the Oberarzt of Prof. Engelhardt. He is a syphilologist and has acquired a good reputation in Germany. About three months ago the I.G. Farbenindustrie in Hochst approached Dr. Hällstrung with a request to test a new antiluetic, that had been synthesized in the laboratories in Hochst. Dr. Hällstrung stated that the bottle was marked T.M., that it was a yellow solution, that was injected intravenously and was supposed to represent a new arsenical, effective especially against seroresistant and cerebro-spinal syphilis. The chemist who synthesized it is unknown to him. Hällstrung did not disclose any more at first. After a lengthy interrogation Hällstrung produced a paper, which represents a preliminary report on the new substance. It discloses that the new substance is called Spirotrypan. It is an arsenobenzol containing sulfur. It is prepared in aqueous solution, which is supposed to contain two (2%) per cent arsenic and 0.43% sulfur. This combination is supposed to have a high avidity and to kill trypanosomes species, which have acquired a high degree of resistance against the ordinary arsenicals. Dr. Hällstrung has tested spirotrypan on 41 patients, with different types and stages of lues (lues cerebrospinalis, progressive paralysis, Lues II and I). He comes to the conclusion that Spirotrypan penetrates faster in proportionally larger concentration into the blood than other arsenicals and that it therefore represents an advance in the treatment of all forms of lues of the cerebro-spinal system.

HÜLLSTRUNG, H. (Author)

Summary of the Article:

On the Question of the Permeability of Organic Arsenical Into the Cerebrospinal Fluid.

The question concerning the permeability of the blood-liquor resp. blood-cerebral barrier for organic arsenicals, esp. for salvarsan, has been the subject of several thorough investigations whose results contradicted each other. The qualitative and quantitative methods used in these were at first purely chemical, such as the determination of the arsenic content itself (Vonkessel and Kimmig, 1) and others), then the ability of the primary amino-group in salvarsan to react, in which after diazotization and coupling with a phenol (Abelius, Hällstrung and Nordmeyer, 2) and Hällstrung and Schälske 3), or after a combination with p-dimethylamino-benzaldehyde (Ehrlich) there occurs a color reaction whose intensity may be determined colorimetrically. Arsenobenzoles which do not contain a free amino-group are thus not covered by these reactions. Arsinic acids and arsinoxides, on the other hand, will react just as salvarsan as long as they bear free amino-groups, although their biological properties differ greatly from the arsenobenzoles. Thus these chemical methods do not offer any information on the type of combin-

ation in which the arsenic preparations appear in the liquor.

Hawking and his collaborators⁴⁾ therefore extended several years ago the chemical arsenic determination in the liquor by a new biological method, according to which they determined the trypanocidal properties of a liquor after administration of arsenic compounds *in vitro*. Their method is based on the fundamental works primarily of Voegtlia and Smith⁵⁾ on the mechanism of the effect of aromatic arsenical, according to which the arsanobenzoles are changed in the organism into the corresponding arsinoxides by means of oxidation, and the arsinic acids are changed into the corresponding form of oxide by means of reduction.

Evidently these oxides exert *in vivo* the pronounced trypanocidal and spirochetocidal effects. As a proof for their theory these authors stated that the arsanobenzoles and arsinic acids required, in contrast to the arsinoxides, a certain period of latency to develop their full effect. Moreover they pointed out that only arsinoxides are able, even in greatest dilutions, to kill trypanosoma *in vitro*, whereas arsanobenzoles and arsinic acids are almost ineffective *in vitro*. In regard to the question of the liquor permeability it is further of significance that the arsin-oxides diffuse more readily through the cell membranes because of their smaller molecules, than the semicolloidal arsanobenzoles.

Although the successful clinical application of salvarsan is possible in syphilitic affections of the central nervous system (saturation therapy acc. to Schreus), it holds generally true that the commercial arsanobenzoles have no unequivocal and lasting effect in those forms of spirochete and trypanosoma diseases which have already affected the central nervous system.

It has not been explained whether the slight effect of the known arsanobenzoles of commerce in the central nervous system is only the result of the size of their molecules and their semi-colloidal character which decrease their ability to penetrate, or whether the oxides, assumed to be the effective fragments, are ineffective in the central nervous system. In any case, there arises the question: Are there arsanobenzol compounds which possess an improved ability to penetrate into the liquor, or whose split products are even effective in presence of nerve tissue?

Some time ago the I.G. Farbenindustrie A.G., Werk Höchst, contacted the present author with the request that he should examine for its penetrability an arsanobenzoate which was selected according to a new point of approach and which was made available under the name "Spirotrypan". This preparation and the knowledge of the new biological test method in the modification of the American authors were cause for the resumption of the author's liquor investigations in patients.

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Hawkins and collaborators agree with Voegtlin in the assumption that the arsenicals appear in the cerebrospinal fluid predominantly as oxides and display their effect there. Therefore they compared in vitro the trypanocidal concentration limits of the liquors after previously treating the patients with arsanobenzoles or arsinic acids, concomitantly with the trypanocidal titer of an arsinoxide of analogous composition in order to eliminate the changing resistance of the trypanosoma and the fluctuations of the nutrient media.

As a standard arsinoxide they used in their investigations with arsinic acids the arsimoxide of tryparsamide which had been treated with thioglykolic acid. Special value they attached to a nutrient solution which permitted their strain of trypanosoma (strain Rhodesiense of Warrington Yorke) to survive as long as possible. For this a Locke-serum solution appeared suitable to which 0.2% glucose had been added. In this the trypanosoma survived normally for up to 48 hrs. If one adds to this suspension of trypanosoma in Locke-serum-glucose-solution (LStr) the liquor of patients who had undergone treatment with certain arsenicals, the trypanosoma are killed after a shorter or longer period either by the cerebrospinal fluid itself or its dilutions. In this manner one may establish a trypanocidal titer for every sample of cerebrospinal fluid. After treatment with certain arsenicals this titer began to rise after 14 hrs.; after 30 - 40 hrs. it attained its maximum; and after about 80 hrs. dropped to zero.

After suitable familiarization and slight modifications, Hawkins' method also appeared very usable in the author's laboratory. The only changes were an increase of the glucose content of the Locke-serum solution to 0.4%, the use of inactivated bovine serum, and the maintenance of a constant pH of 7.4 to 7.6. The blood of a mouse or a rat, highly infected with Tryp. Rhodesiense is centrifuged after addition of citrate, and the supernatant membrane containing the trypanosoma is poured off. This suspension of trypanosoma is washed with a Locke-serum-glucose solution and, after renewed centrifugation adjusted in such a manner that 1500-2000 trypanosoma are contained in each cc. In preliminary experiments it was shown that survival of the trypanosoma could be maintained with certainty for 24 hours, sometimes even for 48 hours in the LStr-solution. For the liquor tests themselves, 1 cc cerebrospinal fluid was treated with 1 cc LStr-solution and 1 drop of trypanosoma suspension and additional dilutions were obtained by previous pipetting into 1 cc LStr-solution in each case. In the cerebrospinal fluid of patients who had received no arsenicals for weeks previously it appeared likewise that after 24 hours numerous trypanosoma survived, even in the dilution 1 : 2. (The count was taken in a Thoma-Zeiss counting chamber).

After this preliminary work the author turned to the actual problems: 1. Which trypanocidal effect does the liquor have after the addition of Spirotrypan, in comparison to neo-salvarsan? 2. May one determine any differences in the efficacy of cerebrospinal fluid in different forms of syphilis?

According to the data furnished by the manufacturers, Spirotrypan is a new, sulfur-containing arsenobenzole; in the form available to the present author it is in aqueous solution in which it is adjusted in such a manner that the solution contains 2% arsenic and 0.43% sulfur. The compound is said to be characterized by high avidity and thus able to kill strains of trypanosoma which have a maximal resistance against certain arsenicals. The following impressive illustration illustrates this point: A patient (syphilis II), whose numerous moist papules were not affected by a combined salvarsan-bismogenol treatment (5.25 gm neosalvarsan, became free of clinical symptoms after Spirotrypan-bismogenol treatment.

The author's own investigations were performed on 41 patients in various stages of syphilis (*Lues cerebrospinalis*, progressive paralysis, syphilis II, syphilis I). Each of these patients received 3 cc Spirotrypan intravenously, resp. neosalvarsan in the dosage of 0.3 or 0.45 gm intravenously. For weeks the patients had received no organic arsenic compounds. Their various liquors were taken in a period that varied from 11 to 64 hours after treatment, and they were tested immediately for the trypanocidal effect. At the same time the number of cells was determined. To lower the above-named sources of error, a control test was performed in each case with that arsinoxide which contained the chemical grouping on the benzol nucleus which is characteristic for spirotrypan and which the Höchst laboratories had furnished especially for this purpose. This arsinoxide killed the *Trypanosoma Rhodesiense* even in a dilution of 1 : 200 - 600,000,000, depending on the resistance of the causative agents and the quality of the nutrient media. When it was found that in the same experiment the liquor was effective in a dilution of 1 : 4 and the arsinoxide with a dilution 1 : 400 000 000, there was calculated for the undiluted cerebrospinal fluid by biological means an arsinoxide concentration of 1 : 100 000 000. For the comparative experiments with neosalvarsan, at first the arsinoxide of Spirotrypan was used, but it proved to be more correct to undertake a comparison of the liquor titer after neosalvarsan with the arsinoxide of neosalvarsan itself, which was likewise at the author's disposal. The results of the preliminary experiments and of the principal tests are contained in several tables which will be published elsewhere⁶). At this point only a short summary can be presented which shows the determined trypanocidal titers for the various liquors and their arsinoxides contents. The arsinoxide contents is calculated as the quotient from the trypanocidal titer of the arsinoxide used for comparison and that of the liquor used as the basis of the calculation, a superficial calculation shows that the trypanocidal titer of the cerebrospinal fluid

After Spirotrypan is located at a mean of 1 : 54, after neosalvarsan at about 1 : 2.5; i.e. the liquor is more effective after Spirotrypan.

Trypanocidal effect of the liquor after spirotrypan (3 cc i.v.)

Patient	Trypanocidal titer of the liquor	Trypanocidal titer of arsinoxide of Spiro- trypan	Calculated arsinoxide concentration of liquor
G.V.	1 : 2	1 : 500 million	1 : 250 million
G.B.B.	1 : 16	1 : 500 "	1 : 31 "
E.X.	1 : 16	1 : 500 "	1 : 31 "
F.Sch	1 : 4	1 : 300 "	1 : 75 "
W.D.	1 : 8	1 : 400 "	1 : 50 "
W.M.	1 : 4	1 : 500 "	1 : 125 "
F.O.	1 : 4	1 : 200 "	1 : 50 "
A.B.	1 : 4	1 : 500 "	1 : 125 "
F.W.	1 : 4	1 : 500 "	1 : 125 "
A.Br.	1 : 2 - 1 : 4	1 : 400 "	1 : 150 "
A.K.	1 : 4	1 : 400 "	1 : 100 "
K.M.	1 : 2 - 1 : 4	1 : 500 "	1 : 187 "
L.H.	1 : 2	1 : 400 "	1 : 200 "
F.B.	1 : 4	1 : 600 "	1 : 150 "
K.F.	1 : 2 - 1 : 4	1 : 400 "	1 : 150 "
F.J.	1 : 4	1 : 400 "	1 : 100 "
M.St.	1 : 2 - 1 : 4	1 : 500 "	1 : 187 "
A.K.	1 : 4	1 : 300 "	1 : 75 "
H.V.	1 : 2 - 1 : 4	1 : 500 "	1 : 187 "
R.Sch.	1 : 4	1 : 500 "	1 : 125 "
A.W.	1 : 4	1 : 300 "	1 : 75 "
K.	1 : 8	1 : 400 "	1 : 50 "
H.U.	1 : 4	1 : 400 "	1 : 100 "
F.J.	1 : 8	1 : 400 "	1 : 50 "
B.	1 : 4	1 : 500 "	1 : 125 "
E.P.	1 : 2 - 1 : 4	1 : 500 "	1 : 187 "
Mean arsinoxide concentration			1 : 117 "
			- 0.00085 /cc

In the calculation of the arsinoxide concentration after neosalvarsan the numbers of the first neosalvarsan patients were omitted, since they had been determined with the arsinoxides of Spirotrypan and only those concentrations were calculated in which the arsinoxide of neosalvarsan had been used as a comparative substance. With this limitation one obtains a mean arsinoxide content of the liquor after Spirotrypan with a concentration of 1 : 117 million (= 0.00085 /cc), after neosalvarsan with 1 : 200 million (= 0.0005 /cc). The arsinoxide content after Spirotrypan thus is on the average about 70% higher than after neosalvarsan.

Trypanocidal effect of the liquor after neosalvarsan (0.3 & 0.45 gm intravenously).

Patient	Dosage in gm.	Trypanocidal titer of liquor	Trypanocidal titer of arsinoxide oxide concentration of neosalvarsan	Calculated arsin- oxide concentration of the liquor
J.M.	0.3	1 : 2		
H.V.	0.45	1 : 4		
M.G.	0.45	1 : 4		
G.T.	0.45	1 : 4		
F.	0.3	1 : 4		
A.H.	0.45	1 : 2		
R.C.	0.3	1 : 2	1 : 500 000 000	1 : 250 000 000
A.D.	0.3	1 : 2	1 : 400 000 000	1 : 200 000 000
E.F.	0.45	1 : 2	1 : 400 000 000	1 : 200 000 000
J.K.	0.45	1 : 2	1 : 400 000 000	1 : 200 000 000
R.A.	0.45	1 : 2	1 : 200 000 000	1 : 200 000 000
O.R.	0.45	1 : 2	1 : 500 000 000	1 : 250 000 000
Th.K.	0.3	1 : 2	1 : 200 000 000	1 : 100 000 000
Mean arsinoxide concentration : 200 000 000 (- 0.0005 /cc)				

Any rule as to a relation between trypanocidal efficacy and form of syphilis as well as specific changes of the liquor (increased cell count) was not to be determined, likewise not between the various times when the liquor was taken and the trypanocidal values obtained.

These tests should have furnished the proof that also arseno-compounds or their split products may penetrate into the cerebro-fluid through the blood-liquor barrier. Spirotrypan evidently better than neosalvarsan, and it may be assumed that the substance in the liquor, demonstrated by the trypanocidal reaction, represents a decomposition product of the arsenobenzole, presumably the corresponding arsinoxide. The road to synthesize new arsenobenzoles taken by the manufacturers of Spirotrypan in view toward a better penetration into the liquor seems to be promising even though in Spirotrypan examined by the present author the trypanocidal effect is still lower than in the arsionic acid compounds tested by Hawking.

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III Medizinische Fakultät, University of Vienna. (Captain Schlumberger)

A. General.- The medical Faculty of the University of Vienna has been dispersed rather widely. Many members are located in the lake regions of Upper Austria, chiefly at Strobl, Bad Ischl and Gmunden. The following faculty members were contacted.

B. Dr. Ernst Petrovsky, recently returned to civilian status, was in charge of the Viennese Laboratory of Bacteriology and Serology. His research has lately centered about the technique of fluorescent microscopy and its application in the clinical laboratory. He believes that it is the most satisfactory method for discovering tubercle bacilli in the sputum. He is familiar with the Folien test of Dr. Eyer for typhus but considers it of only emergency value. Dr. Petrovsky stressed the fact that during the sudden reverses in Russia and Rumania, when large numbers of louse infested people poured into Vienna and its environs, the anticipated epidemic of typhus did not occur. He believes that the danger of serious epidemics of typhus following dissemination of the infected lice by displaced persons has been exaggerated and that, particularly during the spring and summer, the probability of their occurrence is small. Dr. Petrovsky is a quiet mild-mannered individual who seems to be trustworthy. He wished to set up a bacteriological and serological laboratory for civilian use in Gmunden. He has received permission from the burgemeister to use the Landrathaus pending American military approval.

C. Dr. Joseph Palugyay, was professor of roentgenology at the University of Vienna. He states that the 36 mm photographs of the fluoroscopic image of the chest leave much to be desired and he prefers the 6 x 6 cm photograph. (However, Dr. Weidinger, Chief of a German army hospital for the treatment of tuberculosis located in nearby Alt Aussee, uses the 36 mm photo). Besides the routine anterior-posterior view for chest films, Dr. Palugyay takes one with the tube at an angle of 25° from the vertical. Thus he obtains a good view of the lung apices without interference of the clavicular shadows. In infants he uses a similar procedure but directs the tube from below. This permits examination of the left hilus and hilar lymphodes which in the conventional A-P view are hidden by the heart shadow in children.

D. Dr. Hans Kutschera was professor of internal medicine at the University of Vienna and consultant to Wehrkreis 17. He has been interested in the efficacy of intracutaneous inoculations of virulent tubercle bacilli in patients with pulmonary tuberculosis, particularly those showing hematogenous dissemination. He claims that the immune response set up by the dermal tuberculosis thus induced helps to halt the progresss of the pulmonary lesion and eventually leads to recovery. The skin, preferably of the thigh, is sacrificed once monthly and tubercle bacilli introduced into the

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abrasion. At present he has treated over 600 civilians and 193 soldiers by this method and claims excellent results. (Med. Welt p 343, 1939; Berl. Klin. Wochenschrift, 1944). He admits that for a time he was forbidden to use the method on orders from Berlin, but subsequently it was revoked. He demonstrated charts and X-rays of a single case; the results were dramatic - but, this was the only case for which records were available.

Buerger's disease is treated by the slow injection of 30 mgm of acetylcholine into the femoral artery once weekly. After ten (10) weeks the patients have recovered (sic). Dr. Mütschera claims that the method enhances development of a collateral circulation, and that it has also been found useful in the treatment of frostbite of the extremities.

E. Dr. Emil A. Wassely, was professor of otolaryngology at the University of Vienna. He states that there were few cases of aero-otitis in the German airforce. He attributes this to the fact that a widely patent Eustachian tube was a requisite for admission into the Luftwaffe. All intra-nasal deformities such as septal spur or deviations, hypertrophied turbinates, or enlarged adenoids were corrected before the candidate was accepted for the Luftwaffe. In the first year of the war many cases of chronic otitis occurred in the Wehrmacht, resulting in the loss of many man-hours of work. These formerly resistant conditions yielded rapidly to treatment with a 3% alcoholic solution of sulfathiazole. Gauze was soaked in the solution and then inserted deeply into the external auditory canal. Dr. Wassely is inventor of the Relaskop which permits binocular vision in the examination of the nasopharynx; he is also author of a widely used text on diseases of the ear, nose and throat.

F. Dr. Antoine, was ordinarius of the Gynecological Clinic. He assumed this position in 1938 when the Nazis came into Austria and his predecessor, Prof. Weibel was not found to be politically acceptable. Dr. Antoine had previously been assistant to Prof. Weibel and had enjoyed an excellent professional reputation.

The interrogation of Dr. Antoine did not reveal anything of intelligence value. He is very much interest in the cancer problem, but he states that nothing basically new has been developed in the treatment of cancer of the uterus or the bladder. Radical Surgery (Modified Wertheim Method) is still the treatment of choice, followed by extensive x-ray treatment. Dr. Antoine has developed a new surgical method for the treatment of atresia vaginalis, using part of the colon for the formation of an artificial vagina. To this investigator this did not seem like any new method since at least a similar method is described in most of our own books on Gynecological Surgery. In former times Dr. Antoine has been well known for his numerous and skillful operations for hymenal plastics, made from the mucous membranes of the vagina.

IV. University Medical School, Innsbruck, Austria. (Captain Schwarz).

The medical school of Innsbruck played only a minor role in the chain of German schools. The student body was relatively small. All the former institutes and hospitals were intact. The following members of the teaching staff were present and interrogated:

Prof. Breitner	Surgery
Prof. Sieglbauer	Anatomy
Prof. Schermiaski	Physiology
Prof. Jariach	Pharmacology
Prof. Seefelder	Ophthalmology
Prof. Jagic	Medicine

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All these men performed teaching and hospital activities without offering anything outstanding or new.

It was noted that research activities in this school were carried out only on a very small scale. It seems that the medical school of Vienna was the Austrian research center. Prof. Jagic is a member of the Vienna faculty and confirmed this. The latter was very much interested in the problem of field nephritis. He thinks that several factors contribute to its existence: focal infection and exposure. He has also worked on hormones and their effect on muscle and general fatigue.

Prof. Schermiaski is interested in Nerve-muscle physiology. From a practical military medical viewpoint only this statement seems important: He thinks that no decrease in the action current of a nerve muscle stump occurs, if the amputee starts to exercise his stump as soon as possible after the amputation. This is important from a practical viewpoint since these action currents could be used as a source of power for the later prothesis. In an older amputee, where the amputation was done several years ago (unless he exercises continuously) the current decreases markedly or disappears altogether when a degeneration of the nerve takes place.

V. Medizinische Fakultät Philipps Universität, Marburg, Germany.
(1st Lt. Bucky).

A. General: Except for the partial destruction of the surgical and ophthalmological buildings and the looting of some of the laboratories, the medical school is undamaged. The dean of the medical school is Prof. Dr. Ernst Kretschmer, a well known constitutional psychologist. Information supplied by him and by other key personnel appear in the following paragraphs.

B. Prof. Dr. Ernst Kretschmer, Dean of the medical school and chief of Neuro-psychiatry:

Dr. Kretschmer is working on the following research projects, study of which commenced during the present war. These studies are

on the whole incomplete, and he hoped to continue toward their completion.

1. Dr. K. has found a difference in the reactions of the various body types (pyknic, asthenic, etc.) to injected hormones and sympathetic drugs. He has found that the blood sugar curve following insulin injection varies with body type. The blood pressure curve following the injection of epinephrine is also different in the pyknic than in the asthenic. He believes he has found a marked difference in the tonus of the circulatory system in the various constitutions. Another observed fact. Dr. K. states, is that the disposition of the various body types to certain diseases (e.g. pyknics to coronary thrombosis) may be explained by this experimental study.

2. The study of the antibody formation to foreign proteins, as it varies in the different constitutional types. (In conj. with Dr. Bersin) Formation of antibodies in the normal person, and their constitutional differences.

3. Research on intermediate protein metabolism (In conj. with Dr. Bersin) This study, which had been undertaken for the Wehrmacht, not completed, and interrupted by the allied occupation concerns the following: Constitution and total blood proteins in cases of true exhaustion in soldiers, and methods of therapy of such exhaustion states.

4. Constitution and Criminality. A statistical study of the histories of habitual criminals, constitutional diagnosis and prognosis of the psychopath; the course of criminality in the various body types (i.e. leptosomes have greatest incidence of criminality in youth, pyknics the greatest incidence at climacteric); the constitutional psychopath in the army.

5. Constitution, Efficiency and Productivity (not published, incomplete study) The maxima of productivity of the various constitutional types, in ordinary life; the maintainance of maximum efficiency of production in industry and in the military.

6. Psychoneurosis, and Psychotherapy thereof. The diagnosis and therapy of the war neurosis; the alteration of the present methods of hypnosis from the sudden to the more gradual (see below); disturbances of puberty and their relation to the neuroses.

7. Clinical Neurology and Psychiatry. Diagnosis and therapy of the disseminated encephalomyelitides.

Dr. Kretschmer was also interrogated as to psychiatry in the Wehrmacht. He stated that in the Hitler Army, the method of therapy and prophylaxis was brutality. The psychoneurotic would be in constant fear of exhibiting symptoms, such as motor symptoms, etc. Instead he would withdraw, become a mechanical

soldier, hebephrenoid and apathetic in type. He would thus be difficult to recognize, however, serving only as ballast to his company. Both psychopathic personalities and manifest psychoneurotics were threatened with disciplinary measures such as punishment-labor battalions. Psychoneurosis was quite rare in the beginning of the war, but appeared in great numbers towards the end, and during the Russian campaign. The German army had some rest centers for the inception of combat fatigue on a similar basis to that of the American army, however, this was never on a great scale, and never highly organized.

Dr. Kretschmer's opinions on the therapy of combat neurotics varied with those of the Nazi state. He was, however, given free hand to treat the cases in his institution as he pleased. He generally followed an outline as follows:

1. An individual psychotherapeutic session with the patient. Dr. K. stresses the importance of this first interview. He believes that many patients can be "cured" in this first interview. It should therefore never be short, even if it lasts for two hours or longer.

2. The first interview failing, Dr. K. resorts to hypnosis. This should be brought about in stages. At the first sitting the patient shall be brought into only a light trance, and the depth of hypnosis shall be gradually increased in each subsequent meeting. Radical attempts at suggestion should not be done, especially in the earlier hypnotic states.

3. Group therapy as convalescent care.

C. Prof. Hans Schmidt - Schleicher. Chief of the Departments of Serology and Bacteriology and Director of Research, Institut für Experimentelle Therapie of the Behrung Werke.

Dr. Schmidt is at present conducting research in the following fields. While many are still in progress, he is handicapped by lack of animals and the internment of several of his collaborators.

1. In collaboration with Prof. Otto Westphal of Goettingen, Dr. Schmidt is attempting to obtain in its pure form an anti blood group O agglutinin.

2. In collaboration with Dr. Peter Weger, formerly of Riga, Latvia, Fellow of the Rockefeller Foundation, Dr. Schmidt has purified several bacterial pyrogens to such an extent that a few milligrams of such a pure pyrogen extract will cause a marked fever reaction.

4. Together with Dr. Vierthaler, he has produced bacterial exotoxins of typhoid bacilli by extraction of the serum of the body cavity of a guinea pig. He is now at work on the production of a diphtheria gravis antiserum. Prof. Vierthaler is now at work on the production of a diphtheria gravis antiserum. Prof. Vierthaler is now in Bad Nauheim, and it has been requested thru the military government that he be transferred to Marburg to assist Dr. Schmidt in his work.

5. The chemical composition and the synthesis of the Wassermann reaction antigen. Dr. Schmidt hopes to synthesize this antigen so that a more controlled Wassermann reaction may be performed.

6. 6. He has been supervising the production of typhus vaccine at the Behring Werke in Marburg. He prefers the egg to the louse intestine and rabbit lung types. There used to be an institute for the production of the vaccine at Lemberg, Poland. This institute was moved from Poland to Marburg where it is now in function. Dr. Hesse, who used to be in charge of this work, is now a prisoner (he is a former SS man). Work in this direction is now at a minimum, however, may be restarted on short notice.

7. He has done some early research work with penicillin which was produced at Höchst. He would like some samples of American penicillin for purpose of standardizing his German made drug. He considers penicillin antiquated because he considers a new synthetic antibiotic much more effective than penicillin. This drug has been developed by Prof. Richard Kuhn, Kaiser Wilhelm Institut, Heidelberg. It is a bacteriostatic, acting in similar fashion as the sulfonamides and penicillin; it is supposed to have few side reactions, and is supposed to be easily synthesized. (His enthusiasm is premature. The drug or rather group of drugs is the Salicil group discussed in several other reports).

C. Prof. Dr. Hans Gremels, Professor of Pharmacology.

Prof. Gremels has done extensive research in the field of metabolism. He is interested in the metabolism and energetics of the organism as it is controlled by the autonomic nervous system and thru the endocrine glands and their secretions. He has studied the various chemical transmitters of the autonomic system, by means of heart-lung-kidney preparations. He has studied the laws governing the function of striate, smooth and cardiac muscle, their oxygen consumption, carbon dioxide production and metabolism. Also studied was the factor of nutrition to metabolism, the specific dynamic action, amino and monosaccharide absorption and digestion.

His research for the Wehrmacht included the problem of therapy in cases of lung edema due to chemical warfare agents. He studied

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the advisability of using morphine in a case of lung edema. He believes morphine not to be contraindicated because even though it depressed respiration somewhat; it has great influence in reducing the edema, and its sum total of effects is thus to advantage.

He knows of no new anti-malarials, sulfonamides or other drugs. Questioning on these drug types yielded no new information.

He has studied the effect on the Warburg respiratory cycle of cyanide gasses.

D. Prof. Dr. Alfred Benninghof, Professor of Anatomy.

This anatomist is interested in the function of anatomical structures. He has devised a means for the demonstration of stress lines in human bones. Here he can show by means of injecting a dye into the lines of cleavage of a decalcified bone specimen (such as in a Spalteholz preparation). He has thus studied the more important weight bearing bones and the skull. This work is of course, of dynamic-orthopaedic importance. Work in this direction is still in progress.

Another interest of his is in tissue cultures. He has studied various aspects of tissue culture, its relation to its media, etc. This work has been discontinued at the present because of destruction of his laboratory, and the lack of laboratory animals.

E. Prof. Dr. Wilhelm Grueter, Ophthalmologist.

Dr. Grueter is the discoverer of the herpes virus, and has occupied himself almost entirely with virology with particular application to ophthalmology. Besides careful study of the herpetic conditions of the eye, Dr. Grueter has undertaken some research in the allied field of the encephalitides, and the relation of the two diseases to the prevalence of virus carriers. For the purpose of demonstrating the results of his research, Dr. Grueter has constructed a special stereoscopic camera, to take pictures of the eye in color. Treatment of herpes of the eye is based largely on thorough lavage with tincture of iodine. During the war, and for the Wehrmacht, he has performed many operations of traumatic cataract of the eye. His clinic has been the center for operations of this kind.

F. Prof. Dr. Uffenorde, Otolaryngologist.

This otolaryngological surgeon, who has served in the Wehrmacht as Lieutenant Colonel, is now a prisoner in his hospital, to which he has been confined. He is at present in full research and practical work. His main interest at present is on the theme of sepsis following angina. He uses the sulfonamides but stresses

the importance of proper surgical therapy. Another interest of his is the origin of deafness in children, due to sub-clinical infections which have point of entrance thru the labyrinthine windows.

VI. Medizinische Fakultät und Veterinärmedizinische Fakultät, Ludwigs Universität, Giessen.

A. The medical school was badly damaged by bombing. Nearly all the buildings were more or less completely destroyed but some have been salvaged by building new roofs or repairing lower floors so that portions of the buildings may be used. Nearby homes and schools have been requisitioned so that most of the clinics are operating and 800 of the former 1600 hospital beds are in use.

B. Prof. Dr. Georg Herzog, Dean. Dr. Herzog has done extensive research and published several volumes on neoplasms, especially tumors of bone. He has visited America on many occasions and has worked with both Geschickter and Copeland, as well as Ewing. He has worked extensively with tissue cultures in connection with his work on tumors, and otherwise. He collaborated with Fisher of Copenhagen on the pathologic and morphologic studies of such tissue cultures. Together with his son, he has studied Dupuytren's contractures in the Wehrmacht and published a paper thereupon.

C. Prof. Dr. Kurt Voit, Professor of Internal Medicine. Dr. Voit has been interested in the metabolism of the cell and has studied the nucleic acids in the blood. In the Wehrmacht, Dr. Voit has studied the problem of field nephritis. He believes that its etiology definitely is not of a focal infectious nature. He thinks that a great factor in its inception is climate, coldness and dampness. Therapeutically he orders nothing p.c. for 3 days, until blood pressure falls, followed by a light carbohydrate diet. He has seen many cases of field nephritis in Russia, 100 cases in one ward at one time.

He has seen many cases of pappataci (sand-fly, phlebotomus) fever in the Caucasus. Because it is so benign, it presented no problem other than that of diagnosis.

D. Prof. Dr. F. Bernhardt, Chief of Surgery. Dr. Bernhardt's work has concerned itself both in civil life and in the Wehrmacht with the surgery of the chest and the oesophagus. He has performed 100 100 thoracoplasties following war injury with only a 3% mortality. He is also specialist in aneurysmal and gall bladder surgery.

He is enthusiastic about the Kuntscheer nail which has been described in several other reports. No new information was obtained from him on any surgical subjects.

E. Prof. Standfuss, Dean of the veterinary school, stated that the school, although damaged, was capable of continuing its work. Its main departments include that of veterinary anatomy

(Prof. Schauder, POW), veterinary physiology (free), the Veterinary Hygiene Institute at which Dr. Boller (formerly of Ankara) is conducting virus studies. Other departments are the Institute for Veterinary Nutrition, and the Staatl. Veterinärisches Untersuchungsamt, both under the direction of Prof. Standfuss, and both concerned with food inspection, bacteriologic and serologic testing. Dr. Standfuss has done much research in the field of paratyphoid and he has published a voluminous literature on that subject. He is at present studying tuberculosis in the cows of Germany, which he says is very prevalent. He is at present studying of hoof and mouth disease but has achieved nothing definite.

VII. Medizinische Fakultät, University of Munich. (Captain Schlumberger).

All the buildings of the University of Munich School of Medicine and its associated clinics have been damaged by fire and high explosive bombs.

Since most of the students were drafted into the Wehrmacht at the outbreak of the war, regardless of the number of semesters they had completed, many will return to finish their courses. Only a few were sent back during the war years for this purpose. Some attempt was made to keep the students in touch with the medical school by means of pamphlets mailed to them at intervals. These contained accounts of recent advances in medicine, or even basic pre-clinical instruction.

Dr. Karl Bauer is acting head of the department of anatomy. He spent some time at the Rockefeller Institute in New York working with tissue culture methods and the organ perfusion apparatus of Carrel and Lindbergh. At present he is carrying out extensive morphological studies on the cerebral cortex. In this he believes to have demonstrated the continuity of glia fibers with the neurofibrilla of the nerve cells. He is of the opinion that the increase in mass and complexity of the "ground substance" between the ganglion cells is the source of the greater functional capacity of the human brain as compared with that of the lower animals.

Dr. Richard Wagner is director of the department of physiology. His most noteworthy recent achievement is the invention of an apparatus for making continuous blood pressure records without the necessity of opening an artery. This method may prove very useful for experimental blood vascular studies in patients. During neuro-surgical or other operative procedures where a permanent continuous tracing of the patient's blood pressure is often desirable it may prove of value.

Dr. August Forst, chief of the department of pharmacology, has been working on the pharmacodynamic proof of W.R. Hess' theory

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that sleep is the result of parasympathetic stimulation of the sleep center in the hypothalamus. Forst found that the sleep-inducing effect of parasympathomimetic drugs and the reverse effect of sympathomimetic drugs lends support to the theory of Hess. To obtain an objective record of the sleep inducing effects of these drugs he devised an apparatus which records the activity of the experimental animal. At present he is making a study of the active pharmaceutical agents in plants commonly thought to have medicinal properties.

Dr. Karl Kisskalt is director of the institute of hygiene, founded by the renowned Max Pettenkofer. The institute includes not only sanitation and hygiene, but the department of bacteriology as well. During the war Kisskalt published an article on the selection and purification of drinking water of which the Sanitätsinspektion printed several thousand copies and distributed them to sanitary officers in the Wehrmacht.

Dr. Oswald Bumke is head of the neurological and psychiatric institute. He agrees with the statements of other German psychiatrists that during the early years of the war neuroses were very uncommon in the Wehrmacht. Furthermore, the gastric neuroses, which in the later years became more common, so closely simulated organic gastric disease that their diagnosis was placed in the hands of internists. In comparing the neuroses of the present war with those of World War I he agrees with the statement of Schaltenbrand that their site had passed from the striated to the smooth muscles. The severe bombing of Munich was unaccompanied by any apparent increase in the incidence of neuroses or psychoses among civilians.

Dr. Emil K. Frey is director of the surgical clinic. During the war he supervised the construction of two emergency operating rooms in the basement of the surgical clinic. Although the superstructure of this building was almost wholly destroyed by fire and near-misses of bombs, the operating rooms and temporary quarters in the basement remained intact. The equipment and ventilation of these rooms does not differ from that ordinarily found in hospitals.

In 1926 Frey and Kraut isolated what they claim is a specific substance (hormone?) from the pancreas and salivary glands. This produces a marked vaso-dilation and an associated fall in blood pressure. Frey declares that the product, marketed as "Padutin" by Bayer is of value in hastening the development of a collateral circulation in early Buerger's disease and in overcoming the arterio-arterial spasm of Raynaud's disease and that of the collateral coronary circulation often found in coronary occlusion. The substance appears in the medical literature of Germany as "Kallekrein".

Dr. Karl Vossschulte is assistant to Dr. Frey. With the latter he has employed the technique of thoracoplasty as introduced by Matiuer (Acta Helvetica ca. 1940-42). This is performed in two stages. In the first stage the third and fourth ribs as well as the accompanying intercostal nerves are resected. The periosteum is treated with 10% formalin to prevent new bone formation. After two weeks or more, depending upon the condition of the patient, the second operation is carried out. The first and second ribs and intercostal nerves are resected, the scapula is mobilized and its inferior tip inserted anterior to the fifth and sixth ribs, though still covered by the overlying pleura. This position of the scapula increases considerably the subsequent degree of pulmonary collapse. Both surgeons have obtained excellent results in the treatment of unilateral tuberculosis by this method.

Another means of obtaining obliteration of pulmonary cavities that they have used is the suction drainage of Monaldi. Suction is obtained by the use of gravity flow similar to that employed in the Wangensteen apparatus. A rubber tube is inserted through the chest wall into the inferior medial portion of the cavity and permitted to remain there for several weeks. Obliteration of even large cavities has been achieved with this technique.

Drs. Frey and Vossschulte use the rubber sponge drain for all cerebral abscesses. Besides its excellence as a relatively non-plugging drain, the rubber sponge prevents prolapse of brain substance by means of the gentle uniform pressure which it exerts. The cisterna magna is completely drained before operation and daily thereafter for a period of 8 to 14 days. The sponge may be changed daily, though this is not always necessary.

Dr. Alfred Schittenhelm, chief of the division of internal medicine, and Prof. Alfred Wiskott, dean of the medical school and chief of the pediatric clinic, are being held for questioning by the CIC.

VIII. Medizinische Fakultät, University of Würzburg (Captain Schluemberger).

The Luitpold Hospital, teaching center of the University of Würzburg Medical School, was severely damaged during the incendiary and high explosive bomb raid of 16 March 1945. However, parts of several buildings still contain patients and it is the hope of the dean, Dr. Karl Hoede, that these may be used for teaching purposes. Capt. Edwin Rosner, MC, of the military government, is furthering this plan. The physics, anatomical, and physiological laboratories in another part of the town were also partly destroyed. The remaining University buildings are burned to the ground. In the physics laboratory Roentgen's room and relics are intact.

Dr. Karl Hoede, now acting dean of the medical school, is on the CIC black list because of his activities in the Nazi party. His specialty is dermatology and venereal diseases, in which fields he has carried out several investigations. He contributed the section on heredity in skin diseases for Just's *Handbuch der Erbiologie des Menschen*, Berlin, 1939-40. Dr. Jurt was also on the faculty of the University, but at present is under surveillance because of his interest in the eugenic aspects of heredity. Dr. Hoede agrees with other German physicians that the intramuscular injection of 2cc of 40% oil of turpentine accompanied by the oral administration of sulfa drugs at the height of the induced fever is an excellent means of curing resistant cases of gonorrhoea. Although he admits that the method is very painful, he insists that other methods of producing "artificial" fever have not been as satisfactory. It is also a good prophylactic measure, for certainly the patient will not carry away the idea that gonorrhoea is no more than a bad cold.

Dr. Hans Rietschel, professor of pediatrics, states that vitamin deficiency diseases among the children of Germany are extremely uncommon. He is skeptical of the so-called hypovitaminoses or "sub-clinical" avitaminoses, though with the onset of actual starvation during the coming winter he expects a sharp rise in all nutritional deficiency diseases. Although the diphtheria morbidity was high in Würzburg during the war, and was often accompanied by a polyneuritis, the mortality was only about 5%. Active immunization is proving very effective in this respect. All forms of diarrhea are on the increase, in infants as well as in children and even adults. Dr. Rietschel attributes this to the general decline of hygiene standards due to scarcity of soap and the absence of an adequate water supply.

Dr. Erich Grafe is professor of internal medicine, with a special interest in metabolic disturbances. His book, "Metabolic Diseases and Their Treatment" was translated by Eugene Dubois and H. Richardson and was published in the US in 1933. Dr. Grafe states that during the war no new methods or agents for the treatment of diabetes were discovered in Germany.

Epidemic hepatitis first appeared among troops stationed in the Caucasus, then rapidly spread throughout the Wehrmacht. During the height of the epidemic, which began about April 1941 and lasted a year, several hundred thousand cases were reported. At a meeting held in Berlin during the winter 1943-44, the foremost German clinicians expressed their views on the etiology, course, and treatment of the disease.

Dr. Grafe believes that "Kriegsphritis" is not identical with acute glomerulonephritis. Like other German physicians, he emphasized the onset with massive edema, elevated blood pressure, and

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frequent cardiac failure in the absence of azotemia. Grafe disagrees with the statement of Dr. Mehr of Hof, that 90% of the cases show complete healing. Rather, he places the figures at about 7%, the rest continue to show blood, albumen and casts in the urine. The ultimate fate of these patients has not yet been determined. This disease was so common that a special Lazarett was set up at Michelfeld, west of Bayreuth, where over 2,000 cases were treated. As consultant to the Sanitätsinspektion he had the opportunity to examine many of these patients. No specific illness such as sore throat or upper respiratory tract infection was associated with the renal lesions. However, these patients may develop typical signs and symptoms of epidemic hepatitis; occasionally the reverse occurred.

The belief that the disease is not identical with acute glomerular nephritis gains some support from the histological examinations of Dr. T. Fahr, the well known pathologist in Hamburg. Fahr's son, Ernst Fahr, is resident pathologist at the Luitpold Hospital and possesses several microscopic sections of these kidneys that had been examined by his father. The characteristic wide spread inflammatory changes in the glomeruli are absent; in their stead is a low grade interstitial inflammation with marked edema. Fahr Sr. calls the lesion a "serious interstitial inflammation".

Dr. Georg Schaltenbrand, professor of neurology and Oberarzt in the Wehrmacht, is at present in the POW lazarett in Mergentheim. He is author of a monograph on multiple sclerosis (1943) and during the war was particularly interested in the neuritides. Schaltenbrand studied 100 cases of post-diphtheritic polyneuritis occurring on the Russian front; of these, about 30 were wound infections. Most interesting was the relatively frequent finding of polyneuritis in cases of Wolhynian (trench) fever. The neuritis begins when the fever is at its height, most frequently involves the legs, and may resemble a Landry's paralysis. The paralysis may not clear up for over a year. Sensory disturbances are most marked in the lumbar rather than in the sacral segments.

During the six years of war Dr. Schaltenbrand found eight cases of Guillain - Barre polyneuritis. The spinal fluid shows a characteristic elevation of albumen associated with a low cell count. The nerves and nerve roots are infiltrated with neutrophils, but most noteworthy is the intense hyperemia and edema of these structures. The extra-renal syndrome of Nonnenbruch (renal insufficiency without morphological changes in the kidney) is often found in this disease. As noted in a previous report, this form of polyneuritis has also been observed in German soldiers by Dr. Meggendorfer of the University of Erlangen.

Stabsarzt Erich Mueller was a resident pathologist at the Luitpold Hospital before beginning service in the Luftwaffe; he is now in the PW Lazarett in Mergesheim. Earlier experiments had shown that animals such as guinea pigs remained alive from one to several hours when carried to elevations of 12,000 meters without an oxygen supply. However, German aviators died when they were without oxygen for periods as short as five minutes at an altitude of 7,000 meters. Histologically the most important findings were vacuolization and degeneration of the cytoplasm in the liver cells, adrenal medulla, and heart muscle. Studies on the changes in the central nervous system have not been completed.

Sudden death following apparent recovery after a relatively short exposure to cold and immersion was frequently observed. For example, 104 men were rescued four hours after their torpedo boat had been sunk in the English Channel in April 1943. Of these 80 died quite suddenly at different times during their convalescence with symptoms of acute cardiac collapse. These patients, as well as others having a similar history, had a fever up to 40°C. for about two days after their rescue; there was no evidence of pneumonia. Cardiovascular signs were limited to hypotension and extra-systoles, with coldness and cyanosis of the extremities often accompanied by petechiae. Death followed upon slight exertion, e.g., during a game of cards. Histologically the adrenal cortex was wholly depleted of lipoids, the glycogen content of the heart muscle was low, and many fat-free vacuoles were found in the cytoplasm of the acinar cells of the pancreas. The mechanism of these deaths is not yet clear, though Dr. Mueller believes it is related to a disturbance of the cellular oxidation-reduction mechanism.

IX Medical Research Institute, Garmisch-Partenkirchen. (Captain Schwarz).

This institute has carried out research in extremely varied fields (It has been visited by many teams of investigators and doubtless will be the subject of several reports). From the medical viewpoint the work on "Eye Prothesis" appear to be the most interesting ones.

1. In the case of the forearm prothesis the procedure is as follows: A light aluminum ring is put around the remaining stump. To this ring is attached a small contact which can be closed by contracting the remaining muscle stumps. This contact in turn closes or disconnects the current from a regular flash light battery. Once the current is closed it activates a small electro-magnet which can easily be housed in the fore arm prosthesis. The electro-magnet in turn pulls a small spring and the contraction or release of this spring closes or opens the hand.

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2. The leg prosthesis is based on a similar principle using the action current of the sciatic nerve as a source of power multiplied, of course, by a special apparatus housed in the prosthesis.

3. The eye prosthesis is based on the principal of photo-electronics. Cut out letters are slowly passed through a given source of light creating different effects in photoelectric cells which changes these light impressions into sound with the result that one has to be trained to this particular sound and he can that way "read" each letter with his ears.

I. Reserve-Jagdrett, Horaching, Austria (Captain Schlumberger)

This installation presented no new or outstanding features. However, one member of the staff, Stabsarzt, Felix Otto Horing, has had extensive field experience in malaria control in Greece and North Africa. The following information supplied by him merely confirms previously acquired facts as to standard German practice in malaria control and therapy.

1. The Wehrmacht had eight (8) teams that traveled through the malarious districts giving lectures to the medical officers and troops, as well as instituting sanitary measures such as spraying ponds, draining swamps, etc. Each team consisted of one medical officer, one entomologist, one technician, and four enlisted men. Transportation was provided by a truck (which contained the laboratory) and a passenger car.

2. Prophylactic treatment consisted of one 0.06 gm tablet of atabrin daily, or an 0.1 gm tablet twice daily, twice weekly. This method proved satisfactory, though Horing states that it never prevented contraction of the disease, but merely restricted clinical manifestations to no more than 10% of the troops at one time.

3. The standard treatment of malaria was: 0.1 gm atabrin t.i.d. for seven days followed by 0.01 gm plasmochin t.i.d. for three days. In very severe infections, particularly with *P. falciparum*, 0.3 gm of atabrin was given intramuscularly b.i.d. for two or three days. To prevent lengthy hospitalization, recurrences were treated with 0.1 gm of atabrin six times daily and 0.01 gm of plasmochin three times daily for the first two days. On the third day 0.1 gm of atabrin and 0.01 gm of plasmochin were administered t.i.d., on the fourth and fifth days only 0.1 gm of atabrin was given t.i.d. Horing claims that these massive doses seldom led to gastric upsets and denies that there was any evidence of liver damage. Recurrences were noted in 30-35% of the cases infected with *P. vivax*; Horing does not believe that plasmochin prevents these.

XII. Neurosurgical Institute of Berlin, (Captain Schlumberger)

A. General: In December 1943 the Neurosurgical Institute of the University of Berlin and the Luftwaffen Lazarett Berlin (Forschungsstelle für Hirn-Rückenmark-und Nervenverletzungen) were moved to Bad Ischl in Upper Austria. These were, and still are, under the direction of Generalarzt Prof. Dr. W. Tönnis, now supervised by the Third US Army. Dr. Tönnis is editor of the Zentralblatt für Neurochirurgie and has an international reputation among neurosurgeons. With the outbreak of the war in 1939 the Institute began an intensive program for the study of brain, spinal cord, and peripheral nerve injuries. Besides the development of operative techniques, extensive investigations were carried out on the effect of cerebral injury upon the basal metabolic rate, respiration and blood pressure, as well as on the altered structure and function of other viscera. Data were kept on the course of all patients after their discharge from the hospital and at present records of several thousand such patients are available. In many instances these histories cover a three (3) year period. About two (2) months ago 8,000 to 9,000 of these cases records were moved in the care of Oberstabsarzt Müller of the Luftwaffenlazarett in that city. Whether they have since been moved to the Neurosurgical Clinic of Dr. Hugo Krayenbühl in Zurich, Switzerland is unknown. Along with the same histories were sent statistical analyses, kodachrome as well as black and white photographs, motion picture films of operative procedures, a technical library, and physiological apparatus.

B. Organization. If the institute, as set up by Dr. Tönnis at Bad Ischl, will be allowed to continue the function, the material now at Isny should be returned that the data therein contained may be studied. The institute at Bad Ischl is set up as follows:

1. Neurosurgery: 200 beds in Hotel Kaiserkrone under direction of Stabsarzt Brich Fischer-Brugge.
2. Neurology: 300 beds in Hotel Müncher Hof; director Stabsarzt W. Ruskau. Another similar 300 beds were moved to Isny; director, Stabsarzt Rehwald.
3. Peripheral Nerves: 200 beds in Haus Helics; director, Stabsarzt H. Cordel.
4. Internal Medicine: 120 beds in Elizabeth Haus; director, Stabsarzt E. Dworacek.
5. Otolaryngology: Hotel Kaiserkrone; director Stabsarzt Kunz. Special emphasis on maxillo-facial and sinusoidal injuries complicating cerebral wounds.
6. Ophthalmology: Hotel Kaiserkrone; director, Stabsarzt Blank. Ocular disturbances after brain injury.

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Koerntgenology: Hotel Kaiserkrone; director, Stabsarzt Spaar.

8. Electroencephalography: Haus Bauer; director Dr. Gruttner.
9. Pathological Anatomy; Elizabeth Haus, autopsy room in Hotel Kaiserkrone; director, Stabsarzt W. Krucke.
10. Bacteriology and Serology: Haus Eden, director, Obersarzt H. Peter.
11. Statistical Sections: Stabsarzt R. Franckenstein.

Since these hospital units were set up in former hotels they lack many desirable conveniences; nevertheless, they are quite adequate under the circumstances.

After this survey had been nearly completed a CIOS team headed by Major Alexander appeared for the purpose of interrogating Dr. Tonnis. Because Major Alexander is himself a neurologist, a technical evaluation of the work of the Institute will be omitted since it will form the subject of his report.

XII William G. Kerckhoff Institute, Bad Nauheim (Captain McCarthy)

A. Description of the Target.

The target consists of one (1) large building, 250 x 50 feet, three (3) stories high. It is beautifully built of sand stone and closely resembles an American university building of the more modern type. It was built by the private funds of the late W.G. Kerckhoff, a German who suffered with heart disease for many years. His wife, who still lives in Los Angeles, California, endowed it heavily with a large sum. In 1938 the Board of Directors voted to remove the capital sum from the U.S. to Germany. These funds have gradually diminished until all monies ceased to be paid into the Institute about a year ago. For the past year it has been running a diagnostic and treatment x-ray department and a clinical laboratory in order to make expenses.

The Institute was created for research and study of diseases of the circulation and the heart. Within the past six (6) months it has opened its doors to receive four bombed-out university research departments. Its activities are now divided into five (5) sections:

1. The Department of Electrophysiology. (This is the largest and most important section.)
2. Statistical Mathematics.
3. Radiology.

4. Clinical Laboratory for Special Tests.

5.

- a. Pharmaceutical Institute from the University of Giessen.
- b. Physiological Institute from the University of Danzig
- c. Anatomical Institute from the University of Giessen.
- d. Psychological Institute from the University of Danzig.

The Institute is completely intact except for two (2) small rooms, formerly used as part of a museum, that were gutted by an incendiary bomb in December 1944. It contains many unusual laboratory instruments used to study the nervous mechanism of the circulatory system. Many of them were built by the Director, Prof. Hans Schaefer, and exist in no other laboratory. At the time of my visit research and clinical work was going on in all sections of the Institute.

The Institute is completely equipped and aside from its need for three (3) 100 volt batteries it has sufficient material and personnel to carry on. No coal will be needed for experiments. This Institute will be heated next winter from a central heating plant which heats all the German hospitals at present in operation at Bad Nauheim.

B. Personnel.

Dr. Gurtel, the well known x-ray man was and still is the real Director of the Institute although he fled to America in 1934 and is now practicing in New York.

Prof. Dr. Hans Schaefer has been the actual director for the past five (5) years. He is thirty-nine (39) years old, speaks English rather well and was very cooperative. After a five (5) hour interview with him I came away with the impression that he was an extremely capable and energetic man with extraordinary research capabilities. He is a physiologist specializing in electrophysiology of the circulation only. Certain facts disclosed during this interview convinced me he had been anti-Nazi during his term as director. Only a very small amount of research in war medicine was done by him or his assistants. He is the author of a two (2) volume work on "Electrophysiology" well known in America and a large number of scientific articles.

Under Schaefer's direction Fraulein Dr. Geppert conducts a department of Statistical Mathematics. This department was created to gather large numbers of statistics on electrocardiograms, basal metabolism tests, etc. which would serve as a basis for research on the circulation. She has two (2) other medical assistants, Dr. Herbert Gepfert and Dr. Magdalene Kahn carrying on special phases of this work. There are also ten (10) specially trained female technical assistants.

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Dr. Hubert Lessen, former assistant of Dr. Görtel, is in charge of the department of radiology. He is said to be one of the leading radiologists in Germany and was connected with the University of Frankfurt before being bombed out. He spends two (2) days a week in a temporary clinic in Frankfurt.

Prof. Dr. Fritz Hildebrandt, director of the Pharmaceutical Institute at the University of Giessen.

Prof. Dr. Rudolf Thauer, director of the Physiological Institute of the University of Danzig.

Prof. Dr. Ferdinand Wagnleitner, director of the Anatomical Institute of the University of Giessen.

Prof. Dr. Walter Ehrenstein, director of the Psychological Institute of the University of Danzig.

The latter four (4) men in addition to carrying on their own research are collaborating with Prof. Schaefer in various phases of his work.

C. Research completed in the last five (5) years.

This has been almost entirely devoted to the electrophysiology of the circulation with only a few works on war medicine. They are listed as follows:

1. Studies on Tetanus with reference to:

- a. Alterations in muscle fibers.
- b. Alterations in the motor end plates.
- c. Changes in the sensory organs of the muscles.

2. Possibility of using intravenous oxygen therapy. - It was found not possible by this method to increase the oxygen of the blood because of the formation of bubbles in the vessels resulting in the blocking of the vessels. Methemoglobin occurred and the oxygen content of experimental animals was actually lowered.

3. Studies on the electrophysiology of the heart muscles in five (5) phases.

a. Polarization of heart muscles (Frogs, Turtles, Guinea Pigs)

b. Investigation of the origin of the heart beat simultaneous, E.C.G. tracings of sinus node, auricles and ventricles,

c. A study of our physical knowledge of the origin of the potential in the heart muscle.

d. Demonstration of monophasic electrocardiogram recorded with micro instead of macroelectrodes. This investigation proved that the "difference" theory is correct.

e. Same as d but done with experimental animals under influence of anoxemia. The Luftwaffe was interested in this work and it was done under their auspices. It was found that different parts of the heart react in different degrees to anoxemia. Transmission of impulses is delayed and this delay can be measured with the E.M.G.

4. Research on the centripetal impulses, i.e. sensory impulses from heart to brain. There were found to be several forms of impulses.

a. Those synchronous with the heart beat.

b. Those synchronous with the respiration.

c. Undefined impulses known as the Jarisch-Hessold reflexes.

Animals given Veratrin will show the (c) impulses and eventually go into collapse.

5. Influence of certain drugs and anoxemia on these impulses by experiments using cross circulation in two (2) dogs which allows a differentiation between effects of a central and peripheral anoxemia.

6. Influence of "Blacking Out" on Jarisch-Hessold reflex and results of giving calcium and yohimbine using guinea pigs as experimental animals.

7. Same experiments as in (6) but done on men, i.e. a study of the calcium content of the blood and susceptibility to black-outs. There was found no correlation between the two although calcium is a cardio depressant and has a strong action on the vegetative nervous system. Such results were contrary to expectations but agreed with those done on guinea pigs. The investigators felt that there was nothing wrong with the technique. Perhaps the fact that the experiments were done only on thirty (30) men might account for discrepancy in the expected result.

8. Studies on technique in electrophysiologic research. See reprints.

9. Further studies in tetanus with reference to muscle metabolism.

D. Current Research Problems.

1. Extensive research with various drugs to study their effect on visual acuity and the raising or lowering the threshold of vision. One substance known as Pervitin (a benzidrine-like substance) used for some time in the Luftwaffe and in the Infantry Branch of the Wehrmacht, was studied extensively. As a result of

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these studies its use was discontinued. It was found to be habit forming; it excited the whole human organism and lead to frequent collapses. Similar information re Pervitin was obtained and will be reported as a result of the interrogation of Prof. Dr. Ferdinand Flury, director of the Pharmaceutical Institute at the University of Würzburg. Accounts of this work as soon as they were finished were turned over to the German Army Medical Service.

2. Studies on respiration and circulation in burns due to radiant heat like that which occurs from incendiary bombs. Conclusions drawn from these studies to date indicate.

- a. There is no increase in histamines.
- b. Great increase in fermentative substances that act on smooth muscle fibers, leading to collapse. This work is being continued.

3. Studies on the action of fermentative substances (histamine, potassium, acetylcochin, adrenalin, etc.) on smooth muscles.

4. Studies on basal metabolism.

- a. Influence on the B.M.R.
- b. Alteration of hemoglobin due to hunger.

5. Continuation of study of the measuring of impulses from the nerves of the heart.

6. Influence of certain drugs with an exciting effect on the nerves of the muscles in the circulatory system.

7. Various physiological studies on the circulation carried on in collaboration with the bombed out departments from Danzig and Giessen mentioned above.

E. Secret Research Work Done at Rechlin.

Dr. Schaefer went to the large Luftwaffe research station at Rechlin am Moritz See, just north of Berlin. He experimented in dogs on the results of detonation and concussion. He found that they produced:

1. Air-embolism of lungs and coronaries of the heart.
2. A real anoxemia of the blood was produced by oedema of the lungs due to the concussion.

F. An outline of the clinical work done at the Institute.

1. X-ray Department. This department under Dr. H. Lossen, does the diagnostic work for all civilians of Bad Nauheim and its environs. It does deep therapy for Bad Nauheim and Giessen and

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Frankfurt since the latter two cities were bombed.

2. Clinical Laboratory. This department does B.M.R. tests and the more difficult types of laboratory work for all civilians in this area. It also does E.K.G.s and histopathological studies of autopsies done on civilians in this area.

G. Activities of the Pharmaceutical Laboratory of the University of Giessen.

Its director is Prof. Dr. Fritz Hildebrandt aged 58, well known for his work on the action of digitalis and the synthesis of cardiazol known to us as Metrasol. Working for the Knoll Chemical Company he made the standardizing tests on practically all the digitalis used in Germany. Although he brought a large part of his apparatus from Giessen only a fraction of it is in use today. Two to three months by expert workmen will be needed before it can all be repaired. The following projects are underway at present.

1. Effect of drugs especially digitalis and strophanthin upon the circulation.
2. Studies of adrenal substances used to combat circulatory failure.
3. Effect of strychnine on the circulation.
4. Action of spasmotics on bronchial muscles.
5. Influence of drugs on the coronaries especially adrenal cortex.

The remaining three (3) laboratories mentioned above has not yet begun to function due to need of repair of apparatus, lack of personnel, etc. The directors of these departments were absent trying to locate their families.

XIII. Interrogation of Oberstabsarzt Wilhelm Mohr, Chief of Internal Medicine of the Stadtkrankenhaus of Hof. (Captain Schlumberger)

Oberstabsarzt Wilhelm Mohr has been chief of the section on internal medicine in the Stadtkrankenhaus of Hof since 1931. The hospital has a bed capacity of 450, of which 200 are now used for the care of wounded soldiers. Dr. Mohr was interrogated with a view to obtaining information on the incidence and therapy of diseases in the civilian and military population of a small community.

So-called "Kriegsnephritis" has occurred in epidemic form among troops, but Dr. Mohr was unable to cite figures. Though most common on the eastern front it has also been observed elsewhere; bears no relation to the season of the year; and is not proportional to the incidence of upper respiratory infections. Mohr agrees with the view of other physicians and pathologists that the lesion is an acute glomerulonephritis of virus origin. It differs from the

usual type, however, in its sudden onset with severe generalized edema, elevated blood pressure, and absence of azotemia. Early cardio-vascular collapse is a prominent symptom and may have a fatal outcome within 2 - 3 hours; hence, Mohr treats all cases with strophanthin from the outset. If all transportation is avoided, and the patients are kept without food or water for an initial period of eight days, fully 90% recover; very few pass into the subacute or chronic phases of glomerulonephritis.

Dr. Mohr is unfamiliar with the "crush syndrome" characterized by urinary insufficiency with plugging and damage of the distal renal convoluted tubules. This often follows crushing injuries and was first observed in England during the "blitz".

Epidemic hepatitis occurred in all theaters, but was most severe in Russia, the Balkans, and Africa. Up to 12 to 15% of the troops in a given area were affected at one time. In the civilian population Mohr observed the disease most frequently among children, several in the same family were often affected in succession. He had no deaths among these.

Diphtheria increased markedly during the first three years of the war - both in number and severity. Over 50% showed muscular paralyses, while almost 90% gave evidence of myocardial damage, often with heart block. However, the cardiac muscle appeared to recover rather rapidly; the vasomotor center suffered more lasting damage. Frequently anti-toxin, even when employed early in the disease, was of little value. Vaccine prophylaxis is now widely used, though it is not compulsory.

Dr. Mohr had about 80 cases of typhus with only three deaths; these were in patients 74, 62, and 51 years old respectively. The other patients were under 37 years of age. He has used Eyer's Folien Agglutination test in most instances and regards it as a decided and convenient aid to diagnosis. Mohr believes that his good results were in part due to the use of barbituric acid, which he administered t.i.d. in doses of 0.05, 0.05, and 0.1 Gm. He learned the method from a Russian professor of medicine at the University of Minsk who had used the treatment during the typhus epidemic in Moscow in 1923.

Gonorrhea is treated with various sulfa compounds. If resistant to this therapy an intra-gluteal injection of 2 cc of "Globintin" (40% oil of Turpentine) is given. This provokes an acute inflammation with an accompanying elevation of temperature to 39.5 C for about five days. At the completion of the treatment, if the urethral smears are negative the patient is given an intravenous injection of 2 cc of gonococcal vaccine. If this does not invoke a flare-up of the disease he is discharged as cured.

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During the war there has been a decided increase in the incidence of gastric ulcers in civilians as well as in the military personnel. These are often surprisingly large, so that the name "Riesengeschwür" has been applied to them. The cause for this increase is sought for in the emotional tensions which have also called forth a marked increase in gastric neuroses; as well as in the faulty diet.

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